Project Code and Title

B.01.19 Seat Back Strength

Project Objective

The objectives of this research program are to:

1) provide near term support to the Office of Safety Performance Standards (SPS) for responding to the petitions received by the agency regarding seat back strength, and

2) provide longer term support to SPS for future considerations of upgrading Federal Motor Vehicle Safety Standard No. 207, Seating Systems.

Background

There have been several valid criticisms of the current Federal Motor Vehicle Safety Standard (FMVSS) 207 addressing seating systems. Generally it is acknowledged that the current standard requires inadequate seat strength to insure that the seat does not fail when a car is subject to a severe rear impact. Furthermore, technological advances have made possible significant improvement in the ability of the car seat to add appreciable crash victim occupant protection, especially with the advent of integrated seat concepts.

Problem Definition

Motor vehicles are the primary means of travel in the United States for personal and business trips and provide Americans with an extraordinary degree of mobility. Traffic fatalities account for more than 90 percent of all transportation-related fatalities.The NHTSA has been charged with reducing these consequences of vehicular transportation.

National statistics for 1992 reveal that 22,583 drivers were killed and 1,935,000 were injured in crashes on our highways. The right side passenger position accounts for the second most common location of fatalities and injuries among car occupants. It is therefore appropriate to evaluate influencing factors in these statistics and to consider means for injury reduction in these two most frequently occupied seating positions.

Research Approach

- Determine performance of contemporary outboard seats in real world crashes and NHTSA compliance testing. From analysis of the National Accident Sampling System (NASS) and the Fatal Accident Reporting System (FARS) statistics and hard copy files, establish occupant protection performance of the outboard front seats. Investigate front seat performance observed in compliance tests for FMVSS 301, Fuel System Integrity, in which a rigid 4,000 pound moving barrier is crashed into the rear of the subject car at 30 mph.

- Develop computer modeling for front outboard seats which will provide analytic means for estimating occupant protection provided by current seating systems over the range of occupant sizes, occupant genders, and crash severities in frontal and rear crashes. Exercise models to investigate means of improving occupant protection.

- Explore potentials for advanced design of front outboard seating systems to extend occupant protection afforded by these seats to all car crash modes (frontal, rear, side, and rollover.)

Potential Impact/Application

From detailed information on occupant protection functions of current front outboard seat systems, deficiencies will be identified which may be amenable to improvement by modification of current seat designs. Failures of seat back structure in violent rear crashes to verify car compliance with FMVSS No. 301 may signal inadequate seat back strength in some cars. Concerns as to the adequacy of current seating systems can be addressed using the seat computer model for evaluation of the current design and potential modifications. Such work may support considerations for upgrade of FMVSS No. 207 by SPS.

Longer range research on improved front outboard seating systems should lead to demonstrations of a seat design concept to address improved occupant protection in all modes of car crashes. Such a seat system may add support to the car roof during rollover to reduce roof intrusion towards the well belted occupant and may add side impact protection by structurally reacting with an intruding door and providing lateral energy management for the seated occupant through lateral seat bolsters. The advanced seat design would also address improved belt fit and effectiveness for the occupant by employing an integrated seat design with improved accommodation of all occupant sizes. Anti-submarining seat pan design would improve air bag protection in frontal crashes.

Evaluation of contemporary front outboard seating systems through laboratory testing of a representative current seat and development of a computer model to allow analytic study of modifications to improve occupant protection is required to supplement an analysis of accident records focused on front seat occupant protection provided by current seats. To encourage industry improvement of front outboard seating design, development and demonstrated feasibility of an advanced seat concept will be accomplished.

Key Milestones

- Completion of concept phase of advanced integrated seat work by EASi Engineering and Johnson Controls, September 15, 1996.
- Completion of contracting for measurement of ultimate strength of new car seat backs, September 25, 1996.

RESOURCE REQUIREMENTS	FY96	FY97	FY	FY	FY
Contract Money ($K)	200	500			

Project Manager(s)

Jerome Kossar (202) 366-4722, Louis Molino (202) 366-1833

Completion Date

October 1, 1997